

# Measures for the Promotion of Shallow Geothermal Energy Use in the Wałbrzych Pilot Area (PL)

Deliverable D.T4.2.3 Reviewed strategies  
for the use of shallow geothermal energy  
in the investigated target regions and  
cities

Version  
05 2019

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<b>1</b>	<b>1. Information boards: Visualization of existing SGE installations</b>	
<b>Barrier</b>	<b>Aim of Measure</b>	<b>Timeframe</b>
Acceptance	Increased Awareness	Mid-term
<b>Initiator and potential actors</b>		
PIG-PIB, Wałbrzych city municipality, Wałbrzych district authority		
<b>Target group</b>		
General public, end users		
<b>Background</b>		
<p>The advantages of shallow geothermal energy regarding combating air pollution, climate protection, increasing RES use and running costs are commonly not sufficiently considered when choosing a heat source.</p> <p>The measure aims to clearly demonstrate the advantages of geothermal heat pumps (GHP) to the general public.</p>		
<b>Description</b>		
<ol style="list-style-type: none"> <li>1. Identification of suitable (publicly financed or private) shallow geothermal projects;</li> <li>2. Field visits, getting permission from the owners of buildings / real estate to mount the information board</li> <li>3. Query for funding programs and obtaining financing source</li> <li>4. Technical preparation and installation of ca 5-10 information boards presenting current data on existing (= in operation) geothermal heat pumps showing basic data on a heat supply and/or savings of greenhouse gas emissions (compared to earlier heat source) as well as assumption of long term financial benefits (for example in comparison to annual costs of coal used in past as older energy source)</li> </ol>		
<b>Success criteria</b>		
Information boards displayed for at least 3 consecutive years		



<b>2</b>	<b>2. Leaflet: Early information for owner-builders, future investors</b>	
<b>Barrier</b>	<b>Aim of Measure</b>	<b>Timeframe</b>
Acceptance	Increased awareness	Short-term
<b>Initiator and potential actors</b>		
PIG-PIB, Departments of geodesy, cartography and real estate management of local authorities (district / municipality level),		
<b>Target group</b>		
End user		
<b>Background</b>		
<p>Shallow geothermal energy sources in Poland are still rarely implemented when erecting new buildings, although these are especially suitable for the use of shallow geothermal energy. Often, together with the high initial investment costs, operations planning is a crucial factor for this: geothermal energy use is considered too late by future investors to be efficiently integrated into the project schedule. Potential users should be encouraged as early as possible to seek information relating to shallow geothermal energy.</p> <p>It is also of high importance to inform existing owners of single family houses, about advantages of geothermal heat pumps during initial phase of thermal modernization of buildings and choice of a new heat source and additionally about current incentive programs.</p>		
<b>Description</b>		
<ol style="list-style-type: none"> <li>1. Finding a source of financing for issue (design, printing) of a one-page leaflet about shallow geothermal energy with the following contents: <ul style="list-style-type: none"> <li>• Advantages to owners and environment</li> <li>• Technical principles</li> <li>• Easy-to-understand explanation of licensing procedure and indication of locally encountered processing times for authorization</li> <li>• Link to GeoPLASMA-CE maps (traffic light maps / suitability maps)</li> <li>• Contact details for Information on financial grants (“Clean Air” (Czyste powietrze) program), and tax incentives for investors (tax office, Ministry of Finance)</li> <li>• Contact details for further information from authorities (local, district geological administration)</li> </ul> </li> <li>2. Distribution of the leaflet (distribution routes: personally in District Department’s offices, by e-mail or by post - in form of attachments to other official correspondence) to property owners seeking building application or submitting a building notification, buyers of buildings / real estate / undeveloped plots</li> </ol>		
<b>Success criteria</b>		
<ul style="list-style-type: none"> <li>• Leaflet created (ca 2000-3000 pieces)</li> <li>• Distribution organized and functional</li> </ul>		



<b>3</b>	<b>3. Informative meeting: SGE basics for municipal / commune employees</b>	
<b>Barrier</b>	<b>Aim of Measure</b>	<b>Timeframe</b>
Acceptance	Mobilization of municipal / commune actors	Short-term, regularly
<b>Initiator and potential actors</b>		
PIG-PIB, PORT PC, Wałbrzych city (Miasto Wałbrzych), Starostwo powiatu wałbrzyskiego (Wałbrzych district), District's geological authorities, NGO environmental agency		
<b>Target group</b>		
Energy commissioners, environmental departments, water authorities, building authorities, town planners, regional planners, town council		
<b>Background</b>		
<p>Many employees of the municipalities are only indirectly involved in issues regarding shallow geothermal energy, and often do not have any specialized knowledge.</p> <p>In addition to imparting technical knowledge, the occupational points of contact should be elaborated.</p>		
<b>Description</b>		
<p>Informative meeting on possibilities and advantages of use of the shallow geothermal energy to increase RES utilities in the Wałbrzych area, with the following contents:</p> <ul style="list-style-type: none"> <li>• Technical principle</li> <li>• Advantages for owners and environment</li> <li>• Land-use conflicts and licensing procedure</li> <li>• Alignment with the environmental policy targets of the districts, low emission plans and communal plans for heat supply</li> <li>• Implementation opportunities for town planners</li> <li>• Designation of contact persons within the municipalities / communes and the districts authorities</li> <li>• Emphasis of the role model function of the public authorities</li> </ul>		
<b>Success criteria</b>		
Event has taken place with >10 participants		



<b>4</b>	<b>4. Information event: Additional benefits of SGE used for cooling</b>	
<b>Barrier</b>	<b>Aim of Measure</b>	<b>Timeframe</b>
Acceptance	Increase awareness of SGE used for cooling	Short-term
<b>Initiator and potential actors</b>		
PIG-PIB, PORT PC, geothermal heat pump producers or sale representatives, Wałbrzych city (Miasto Wałbrzych), Starostwo powiatu wałbrzyskiego (Wałbrzych district), NGO environmental agency		
<b>Target group</b>		
End users, architects, SGE planning firms and installers, municipal planning authorities and building consultancies, housing societies, business firms from the Wałbrzych Special Economic Area		
<b>Background</b>		
<p>Shallow geothermal installations in the Wałbrzych district are mainly used for heat supply of residential buildings and In less amount for public buildings. Cooling of residential homes, offices or stables are of surprisingly low significance. Feeding into heating or cooling grids is currently not established.</p> <p>The measure aims at promoting lesser-known uses of SGE, in particular cooling of buildings. It is of high importance to inform potential investors of SGE systems about innovated reverse geothermal heat pumps, operating in heating mode during winter and producing cool during summer season.</p>		
<b>Description</b>		
<ol style="list-style-type: none"> <li>1. Collection of information/examples about market offer and existing reverse geothermal heat pumps applications used for heating and cooling in a nearby areas (e.g. Lower Silesia Voivodship);</li> <li>2. Focus on applications with high potential in the Wałbrzych district: Cooling of public buildings such as schools and retirement homes, cooling of residential homes and office buildings, large-area stores, warehouses</li> <li>3. Elaborate presentations and information materials;</li> <li>4. Targeted approach of target groups listed above with an information event.</li> </ol>		
<b>Success criteria</b>		
Event with > 10 participants		



<b>5</b>	<b>5. Information event: Heating grids in the Wałbrzych Energy Cluster</b>	
<b>Barrier</b>	<b>Aim of Measure</b>	<b>Timeframe</b>
Acceptance	Suitability for (local) heating grids, synergy with photovoltaics	During GeoPlasma realisation
<b>Initiator and potential actors</b>		
PIG-PIB, Wałbrzych city - leader of the Wałbrzyski Klaster Energetyczny, PORT PC		
<b>Target group</b>		
Members of the Wałbrzyski Klaster Energetyczny, including communes: Głuszycza, Szczawno-Zdrój, Jedlina-Zdrój & Boguszów-Gorce, Politechnika Wroclawska, Control Process S.A., Innovation AG, MSM Energy sp. z o. o. sp. k., Przedsiębiorstwo Energetyki Ciepłej S. A., Wałbrzyski Związek Wodociągów i Kanalizacji, and municipal companies: Zamek Książ w Wałbrzychu, Stara Kopalnia and Aqua Zdrój		
<b>Background</b>		
<p>Shallow geothermal energy is suitable for base loads in local heating/cooling grids as well as energy grids. Large industrial complexes, public buildings or residential areas can be centrally supplied with geothermal heat or cool. Electric energy necessary to operate the geothermal systems may come from another RES source, for example photovoltaic power plants.</p> <p>The measure aims at highlighting the possibilities of shallow geothermal energy in heating grids within a recently established Wałbrzych Energy Cluster aimed to developed large photovoltaic farms and individual small roof PV installations.</p>		
<b>Description</b>		
<p>1. Creation of training material and information material for distribution with the following content:</p> <ul style="list-style-type: none"> <li>• Easy-to-understand presentation about technical requirements and possibilities of shallow geothermal energy in heating/cooling grids combined with electrical energy provided by photovoltaic installations</li> <li>• Compilation of currently available grants and subsidies for investors</li> <li>• Overview of existing/planned heating grids in the Poland and best practices in other countries</li> <li>• Compilation of examples for successful integration of shallow geothermal energy in heating/cooling grids</li> </ul> <p>2. Event in suitable setting (conference, industrial fair)</p>		
<b>Success criteria</b>		
Event with >10 participants		



<b>6</b>	<b>6. Information boards on SGE exhibited in the Wałbrzych city Town Hall and Stara Kopalnia Center of Art and Science: End user</b>	
<b>Barrier</b>	<b>Aim of Measure</b>	<b>Timeframe</b>
Acceptance	Increase awareness	Mid-term
<b>Initiator and potential actors</b>		
PIG-PIB, PORT PC, municipal company Stara Kopalnia Center of Art and Science		
<b>Target group</b>		
End users, general public, visitors in the Wałbrzych Town Hall and Stara Kopalnia Center of Art and Science,		
<b>Background</b>		
<p>Although the use of shallow geothermal energy has been established in the Wałbrzych city and Wałbrzych district for more than 10 years, the total number of SGE installations is about 60 and growth rate remains low. There is an obvious lack of public awareness on renewable energy sources and insufficient information about advantages SGE use, that would convince people to change present coal heating systems into geothermal heat pumps.</p> <p>The measure aims at imparting basic facts about SGE.</p>		
<b>Description</b>		
<p>After securing financial support exhibition consisting of 6 to 10 information boards (A0 size) is to be prepared and set up and displayed for 1 year time in the Wałbrzych Town Hall and Stara Kopalnia (old mine) museum. Contents should focus on long-term benefits both for the individual (low and stable running costs) and for society (reduction of air pollution, protection of environment, increase of RES use, accordance to energy policies - low emission plans).</p>		
<b>Success criteria</b>		
Exhibition displayed for 1 year, visited by more than 1000 participants		





<b>7</b>	<b>7. Communal / Municipal Incentive programmes: Implementation of funding schemes for applications of geothermal heat pumps</b>	
<b>Barrier</b>	<b>Aim of Measure</b>	<b>Timeframe</b>
Economic feasibility	Reduction of initial investment	Long-term
<b>Initiator and potential actors</b>		
Local authorities (communes, municipalities), PGI-NRI, PORT PC		
<b>Target group</b>		
End user		
<b>Background</b>		
<p>If correctly designed and implemented, BHE are low-cost (in long-term perspective) and very efficient heating and cooling source, with added advantage of avoiding noise, gas and other pollutant emissions to the environment. To combat air pollution local authorities (Wałbrzych city and some communes of the Wałbrzych district) introduced incentive programs for exchange of solid fuels heating systems, which donations can be utilized in addition to the already existing governmental supporting programs. However, most of these supporting schemes give individuals financial donation, only when they buy new gas boilers, electricity heaters, or are connected to district heating network, while exclude from the funding help installation of geothermal heat pumps (GHP). Such discriminatory rules should be changed by local authorities so that GHPs would be enlisted for funding, furthermore on preferable financial conditions as they represent RES.</p>		
<b>Description</b>		
<ol style="list-style-type: none"> <li>1. Identification of existing local acts regarding financial help for individuals aimed for replacement of heat sources.</li> <li>2. Elaboration of suitable changes in existing resolutions to include costs of geothermal heat pumps purchase and installation to be funded on preferred conditions promoting RES.</li> <li>3. Adoption of amended resolutions by local authorities</li> </ol>		
<b>Success criteria</b>		
Increase of new SGE systems bought and installed by individual using financial donation (more than 150 in 5 years)		



<b>8</b>	<b>8. Information campaign: Facilitate access to governmental grants on the applications of geothermal heat pumps (Clean Air program, tax incentives of the Thermomodernization act)</b>	
<b>Barrier</b>	<b>Aim of Measure</b>	<b>Timeframe</b>
Economic feasibility	Information about available grants	Long-term
<b>Initiator and potential actors</b>		
Local authorities (communes, municipalities), Wojewódzki Fundusz Ochrony Środowiska I Gospodarki Wodnej (WGOŚiGW), PGI-NRI, PORT PC		
<b>Target group</b>		
Planner, End user		
<b>Background</b>		
<p>In Sept. 2018 new government incentive program Czyste Powietrze (Clean Air) has been launched. The aim of this nationwide, ten-year program is to improve the energy efficiency of existing single-family houses through thermo-modernization of buildings and exchange of old, mainly coal heat sources by modern installations, including heat pumps. Another option to reduce cost of new heating / cooling installations for owners of single family houses are tax breaks planned for operation since 2019 ( as described in the Thermomodernization Act)</p> <p>There is a big chance to increase use of geothermal heat pumps in the Wałbrzych region if information that purchase and installation costs of this type of heating systems are possible to be refunded in considerable amount of money. Public in general is not aware on that opportunities and only cheaper gas boilers are preferably chosen during exchange of heating sources. In that situation, a wide-scale information campaign should be carried out to promote use of the SGE, as the cleanest RES for heating and cooling.</p>		
<b>Description</b>		
<ol style="list-style-type: none"> <li>1. Elaboration and implementation of a special Web page on the local authorities web-portals: Better visibility of already existing links to relevant sources of information</li> <li>2. After securing financial support, elaboration, printing of one-page leaflet with relevant information about governmental subsidies, grants and tax breaks for geothermal heat pump users. Distribution of leaflets via door to door campaign, collection points in local authorities public offices.</li> <li>3. Dedicated ads in local newspapers</li> </ol>		
<b>Success criteria</b>		
Click-through-rate of 0,5% (sum total of all links offered on local authorities webpages)		
Delivery of ca 5 000 leaflets in areas dominated by individual single-family houses		
Publication of ca 10 ads in local newspapers		



<b>9</b>	<b>9. Information Event: Quality and compliance with the Mining Law (Prawo Geologiczne i Górnictwo)</b>	
<b>Barrier</b>	<b>Aim of Measure</b>	<b>Timeframe</b>
Quality	Improved quality and compliance with law during realization of SGE projects	Short-term
<b>Initiator and potential actors</b>		
PIG-PIB, PORT PC, local geological authorities		
<b>Target group</b>		
Heating installation companies, drilling companies, planners, energy advisors		
<b>Background</b>		
<p>The general public sometimes approach SGE installations with a skeptical attitude due to reports about inefficient, unsatisfactory systems. Unsatisfactory function or operation of an installation out with its optimal parameters can be due to poor design, but also due to poor implementation. Technical standards and obligations stipulated by the licensing authorities are not always complied with. In Poland, there are also many legal violations against licensing procedures described in Mining Law during installation of geothermal heat pumps.</p> <p>The measure aims at strengthening the awareness for the importance of high-quality implementation and compliance with law regulating licensing procedures.</p>		
<b>Description</b>		
<ol style="list-style-type: none"> <li>1. Compilation of „best practice“ examples for SGE systems by PIG-PIB and PORT PC.</li> <li>2. Collection and evaluation of suitable negative practices of SGE applications, for example: <ul style="list-style-type: none"> <li>• Diameter of borehole smaller than mandated</li> <li>• Lack of backfilling or lack of quality check (QC) regarding backfilling</li> <li>• Non-observance of stipulations imposed by geological survey or disregard of information given in geological expert report,</li> <li>• Examples of Mining law violations</li> </ul> </li> <li>3. Information event agenda (e.g. within the frame of an in-house exhibition) <ul style="list-style-type: none"> <li>• Presentation of „best practice“ examples</li> <li>• Presentation of negative examples and explanation of their impact on SGE installation (efficiency, safety)</li> <li>• Presentation of Mining law violations during drillings, set up of the geothermal heat pumps and preparation of final documentation</li> <li>• Advice for implementing craftsmen (planners, drillers, heating contractors), while recognizing the needs and limitations of the investor (costs vs. quality)</li> </ul> </li> </ol>		
<b>Success criteria</b>		
Event with >10 participants		



<b>10</b>	<b>10. Actualization of existing low emission plans and energy supply plans regarding possible SGE use</b>	
<b>Opportunity</b>	<b>Aim of Measure</b>	<b>Timeframe</b>
Planning	Identification of possibilities and practical implementation of the SGE use. Mobilization of municipal / commune actors	Short-term,
<b>Initiator and potential actors</b>		
PIG-PIB, PORT PC, Wałbrzych city office (Miasto Wałbrzych), Wałbrzych district office (Starostwo powiatu wałbrzyskiego), District's geological authorities, NGO environmental agency		
<b>Target group</b>		
Departments of local authorities on district and commune/municipality level responsible for elaboration of the local development/energy plans,		
<b>Background</b>		
<p>In last 3 years, for the Wałbrzych area several development plans were elaborated, including: “Low-carbon economy plan for the Wałbrzych Agglomeration till 2030” (<i>Plan Gospodarki Niskoemisyjnej dla Aglomeracji Wałbrzycha do 2030</i>), “Plan for reduction of the low (chimney) emissions for the Wałbrzych city” (<i>Plan ograniczenia niskiej emisji dla miasta Wałbrzycha</i>) as well as numerous assumptions for plans or communal plans for supply in heat, energy power and gas. In these plans multiple measures like thermos-modernization of buildings with changes of heat sources were planned for implementation. However, only for few of these measures SGE application are foreseen. There is a need to reevaluate these plans in regard to find more possible use of geothermal heat pumps to increase general share of RES.</p>		
<b>Description</b>		
<p>1. Informative meeting on possibilities of use of the shallow geothermal energy to increase RES utilities in the Wałbrzych area, in relation to existing documents and strategies, with the following contents:</p> <ul style="list-style-type: none"> <li>• Use of SGE: advantages for GHP use, possible geo-environmental risks and land-use conflicts</li> <li>• Alignment with the energy, low-carbon and environmental policies of the Wałbrzych areas,</li> <li>• Identification of previously defined measures (objects/buildings) for which GHP systems could still be applied,</li> </ul> <p>2. Reevaluation and short feasibility analysis for selected objects in regard to use of SGE heating/cooling systems.</p> <p>3. Implementation corrected measures into existing plans in form of annexes.</p>		
<b>Success criteria</b>		
Informative event has taken place with >10 participants. 10% of selected measures planned to use SGE systems		



<b>11</b>	<b>11. Dedicated web-portals: Provision of geoscientific data</b>	
<b>Barrier</b>	<b>Aim of Measure</b>	<b>Timeframe</b>
Planning	Publication of maps relating to SGE	During GeoPlasma realisation
<b>Initiator and potential actors</b>		
PIG-PIB, Wałbrzych city office (Miasto Wałbrzych), Wałbrzych district office		
<b>Target group</b>		
Planners, drilling companies, local geological authorities, end users		
<b>Background</b>		
<p>Information relating to the geologic subsurface and its thermal properties are required for the design of SGE installations. For certain systems, the location, important geological and hydrothermal data as well as thermal properties of rocks are crucial for proper planning.</p> <p>These processed data are currently not available for the Wałbrzych city and Wałbrzych district.</p>		
<b>Description</b>		
<ol style="list-style-type: none"> <li>1. Generation of suitable map material relating to: <ul style="list-style-type: none"> <li>• Geothermal energy potential</li> <li>• Hydrogeological conditions</li> <li>• Location evaluation regarding suitability for geothermal utilization</li> <li>• Land-use conflicts (e.g. water protection zones)</li> </ul> </li> <li>2. Publication of the maps in suitable web portals, e.g.: <ul style="list-style-type: none"> <li>• Geothermal maps of the PIG-PIB web map portal (Geologia)</li> <li>• Local geoportals managed by the Wałbrzych city and Wałbrzych district authorities</li> <li>• Web portal of the EU-Project „GeoPLASMA-CE“</li> </ul> </li> </ol>		
<b>Success criteria</b>		
Maps generated and published on selected web-portals		



<b>12</b>	<b>12. Informative meeting / training: Spatial matching analysis of thematic maps regarding SGE use</b>	
<b>Barrier</b>	<b>Aim of Measure</b>	<b>Timeframe</b>
Planning	Identification of areas particularly suitable for SGE utilization	Short-term
<b>Initiator and potential actors</b>		
PIG-PIB, Wałbrzych city office (Miasto Wałbrzych), Wałbrzych district office		
<b>Target group</b>		
Departments of geodesy, cartography and real estate management of local authorities (district / municipality level), Commune / Municipal planning departments for energy supply and plans for reduction of low (chimney) emissions, End users		
<b>Background</b>		
<p>Unlike wind and solar power, shallow geothermal energy is usually not reflected in local energy supply plans. Employees of district authorities as well as the commune / municipality departments responsible for preparation of plans for energy (heat, gas, electricity) supply and also dedicated plans for reduction of low (chimney) emissions do not have access to maps enabling evaluation of particular areas /locations regarding suitability for SGE utilization and they do not have the possibility to implement or communicate such an evaluation.</p> <p>The measure is based on measure Nr. 11 <i>Provision of geoscientific information</i> and aims at identification of areas in which SGE use is explicitly desired, but not mandatory.</p>		
<b>Description</b>		
<p>1. Organization of the Informative meeting / training for employees of the land-use, energy planning offices of local authorities with agenda including:</p> <ul style="list-style-type: none"> <li>• Analysis of geoscientific, thematic maps delivered as results of the GeoPlasma-CE project) and regional planning data in order to identify particularly suitable areas (settlement areas with high geothermal potential), preferentially located in areas with high population density, rural areas (away from district heating network) with individual, single family houses or newly designated building areas.</li> <li>• Identification of suitable areas in land utilization plans regarding use of RES, including utility of geothermal heat pumps. Proposals for exemplary measures, recommendations into land development plans, energy supply plans or other plans (binding / non-binding)</li> </ul> <p>2. Elaboration of specific, defined measures and recommendations for development planning to be implemented (in form of annexes) in local energy supply plans, plans for RES use and reduction of low (chimney) emissions or other land utilization plans</p>		
<b>Success criteria</b>		
Recommendations on SGE use are included in local development plans (on district / commune / municipality level)		



<b>13</b>	<b>13. Providing data on a voluntary basis: Monitoring of GHP annual costs and energy efficiency</b>	
<b>Barrier</b>	<b>Aim of Measure</b>	<b>Timeframe</b>
Planning	Initiation and future Increase share of GHP installations with monitoring. Provision of long-term empirical data and validation of annual cost and energy efficiency of SGE installations	Long-term
<b>Initiator and potential actors</b>		
PIG-PIB, PORT PC		
<b>Target group</b>		
End users, Planners		
<b>Background</b>		
<p>Some SGE installations in the Wałbrzych area are equipped with a software monitoring system which measures and records operating parameters. Monitoring facilitates the optimization of the installation after commissioning and in the long run it is cost effective and environmentally friendly.</p> <p>Lack of long-term experience reports and empirical data for the validation of life-cycle cost models regarding SGE installations is a problem often raised by planners and investors. In particular individuals interested in purchase of the SGE applications are keen to know, for comparative purposes, the detailed operating costs of existing heat pumps and their energy efficiency. To convince them about these issues, the most desirable are data from nearby installations set up in similar geological conditions. However, monitoring programs aimed to collect such data (i.e. annual time of heat pump operation, cost of electricity, volume of heat/cool produced, volume of space heating to hot water production ratio) are not implemented and the data is not publicly available.</p> <p>Data provided on a voluntary basis by owners of SGE, shall be made publicly available for planning purposes.</p> <p>The installation of monitoring systems shall be encouraged and proposal of guidelines for instances of mandatory implementation shall be elaborated.</p>		
<b>Description</b>		



1. Allocation of budget for PGI-NRI, PORT PC from ministerial subsidy or other source of funding
2. Analysis of technical availability and type of data collected automatically by software installed in SGE installations.
3. Selection of data to be collected, transfer methods, and data delivery intervals. Devise form for statistic capture of monitoring systems
4. Identification of existing GHPs installations, field visits and personal interviews with owners, investigation on monitoring equipment for the recording of the following parameter, like:
  - Heat production,
  - Volume of electricity consumption and its costs
5. Signing a voluntary contract for data provision; Transfer of the above parameters to the PIG-PIB and PORT PC for a period of 3 years. Data processing and data storage to be implemented by PIG-PIB,
6. Annual data processing and publication on local authorities webportals
7. Elaboration by PIG-PIB and PORT PC of generic, non-binding recommendations for monitoring of all and any geothermal heat pumps systems,
8. Elaboration of an auxiliary condition for the stipulation of monitoring as part of the license procedure.

#### Success criteria

Until 2020 at least 5 monitoring systems supported and data made publicly available via local authorities webportals. In 2020 - 2028 share of (known) installations with monitoring systems increased by at least 20 % compared to 2018





<b>14</b>	<b>14. Subsurface heat management</b>	
<b>Barrier</b>	<b>Aim of Measure</b>	<b>Timeframe</b>
Planning	Elaboration of management plan for SGE use on district level	Long-term
<b>Initiator and potential actors</b>		
PIG-PIB, local district geological authorities		
<b>Target group</b>		
Water authorities, Departments of geodesy, cartography and real estate management of local authorities (district / municipality level),		
<b>Background</b>		
<p>BHE influence the subsurface temperature distribution in surrounding rocks. Long term use of BHE can sometimes decreased temperature of rocks and cause new neighboring SGE installation less effective. In order to ensure satisfactory functioning of the BHE, existing installations have to be considered during the planning phase. Data gaps and conflicts can particularly occur in densely populated areas with many geothermal installations. For this reason, a comprehensive subsurface heat management plan should be implemented in the Wałbrzych city and Wałbrzych district, where future re-use of mining structures, or re-opening of coal mines may be possible, other subsurface utilizations should be included and managed in a comprehensive subsurface spatial plan.</p> <p>The measure is based on measure 11 <i>Provision of geoscientific information</i> and aims at sustainable, well-regulated utilization of the subsurface geological structures.</p>		
<b>Description</b>		
<ol style="list-style-type: none"> <li>1. Elaboration of suitable methodology for collecting, analysis and evaluation of SGE installations regarding their thermal impact on the subsurface rocks,</li> <li>2. Elaboration of suitable criteria for stipulations and approval of SGE installations, e.g. by allocating fixed heat contingents to properties,</li> <li>3. Discussion about the implementation of the already existing regulations and recommendations regarding subsurface spatial planning, i.e. inclusion of raw materials exploration and exploitation, mineral planning, groundwater management, seasonal storage of heat and cold, etc., in order to facilitate the integration of subsurface heat management plans into a future subsurface spatial plan for Wałbrzych city and Wałbrzych District.</li> </ol>		
<b>Success criteria</b>		
Subsurface heat management plan has been implemented and is integrated into the licensing procedures		